

The opinion in support of the decision being entered  
today was not written for publication and is  
not binding precedent of the Board

Paper No. 25

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte MICHAEL RIEDEL  
and HANS-JURGEN SESTAK

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Appeal No. 2001-1853  
Application 09/198,217

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HEARD: MAY 21, 2002

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Before THOMAS, GROSS and LEVY, Administrative Patent Judges.

THOMAS, Administrative Patent Judge.

DECISION ON APPEAL

Appellants have appealed to the Board from the examiner's  
final rejection of claims 1-19.

Independent claim 1 is reproduced below:

1. A piezoelectric bending transducer, comprising:  
a substrate of electrically insulating material;

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an electromechanical piezoelectret for converting electrical energy into mechanical energy, said piezoelectret being carried on said substrate and having an inner electrode towards said substrate; and

an electrically conductive coating between said inner electrode and said substrate forming an electrical contact at a plurality of locations with said inner electrode, and wherein said conductive coating does not extend to a side of said substrate opposite from said piezoelectret.

The following references are relied on by the examiner:

Bullock	4,140,936	Feb. 20, 1979
Stein et al. (Stein)	5,404,067	Apr. 4, 1995

Claims 1-19 stand rejected under 35 U.S.C. § 103. As evidence of obviousness, the examiner relies only upon Bullock in view of Stein. The examiner's additional reliance in the final rejection upon Bost and Williams in the alternative has been withdrawn as noted at page 5 in the answer.

Rather than repeat the positions of the appellants and the examiner, reference is made to the briefs and the answer for the respective details thereof.

#### OPINION

Among claims 1, 8, 16 and 17, the only claims for which appellants present arguments in the brief and reply brief, we sustain the rejection only of independent claim 1 and dependent

claim 8. Since appellants have not presented arguments as to any other claim on appeal, the rejection of the remaining claims is also sustained.

According to the examiner's general line of reasoning, the subject matter of independent claim 1 on appeal is essentially taught or suggested to the artisan in Bullock except for the feature of a substrate comprising an electrically insulating material, for which the examiner relies upon Stein to teach the obviousness of using it in Bullock.

We agree with the examiner's assessment of Bullock that this reference does not explicitly show electrode coatings on each of the piezoelectric/piezoelectret bending bars 2 in Bullock's Figures 1-5. Yet Bullock does clearly allude to or strongly suggests to the artisan that this feature is known in the art. According to the teachings associated with Figure 3 in the paragraph bridging columns 2 and 3 through at least line 17 of column 3, Bullock clearly teaches that the input terminal 11 is coupled to the outer surface of each of the bars 2 and that the terminal 12 in Figure 3 is coupled to the inner or plate-engaging surface of these bars. This manner of "coupling" is specified beginning at line 14 where it is indicated that the "[w]ire 9 is

soldered in the usual manner to each of the bars so that, in effect, electrodes are provided across the bar thickness and the bars thus become a series of parallel capacitors."

Because Bullock repeatedly teaches the general operability of the overall arrangement of his invention as being based upon certain capacitive effects, it is implicit that each of the bars would be constructed in the same manner as a capacitor by the use of these electrodes. In any event, Stein makes clear at column 1, lines 30-36 as well as each of the Figures 1-3 that elements 14a, 14i and elements 16a, 16i comprise the electrodes associated with each of the bending transducers shown in Figures 1-3 in Stein. Moreover, appellants' discussion of the prior art at specification page 2, lines 23-25 indicates that the "piezoelectret is electrically contacted on both sides with electrodes in the form of a planar coating made from a conductive material." Finally, in the paragraph bridging pages 15 and 16 of the brief, appellants appear to admit that Stein teaches this feature as standard practice in the art anyway.

Although we agree with the examiner's conclusion as to the obviousness of the earlier noted claims the rejection of which we sustain, we find nothing in Bullock which would have indicated to

the artisan either explicitly or implicitly that Bullock would have indicated to the artisan that a nonconductive substrate was implicitly useable as asserted by the examiner at page 4 of the answer. On the other hand, we are persuaded by the totality of evidence before us that it would have been obvious for the artisan to have substituted the metal substrate material 3 in Bullocks' embodiments for an electrically insulating substrate material.

At the outset, we note that Stein essentially teaches an art equivalence for metal and plastic substrates at column 1, lines 30-36. Additionally, Figure 2 in Stein and the discussion at column 3, lines 34-37 and column 4, lines 46-55 contain specific teachings of utilizing such plastic foil inner layer substrate material as 2K shown in Figure 2. Moreover, appellants' own specification at page 3, line 10 through page 4, line 18 indicates that it was known in the art to utilize an electrically insulating material as a substrate material in prior art piezoelectric bending transducer devices.

Additionally, the examiner considers the obviousness of utilizing either an insulating or conductive inner substrate material as a carrier plate in the arguments bridging pages 4 and

5 of the answer based upon such factors as weight, cost, thermal expansion, fatigue and manufacturing ease. In light of this position, we note further that appellants have recognized at the bottom of page 3 of the prior art discussion in their own specification as filed that it was known to be an advantageous feature of utilizing nonconducting or electrically insulating substrate materials because they present an easier ability to match the coefficient of thermal expansion to the piezoelectrets themselves to avoid thermal stresses. Thus, the examiner's reasoning of combinability and substitutability for the substrate materials appears to be well-based.

What independent claim 1 essentially requires in its broadest perspective is that the inventors have essentially solved known prior art problems associated with piezoelectric bending transducers by utilizing in effect two inner electrodes, the inner electrode normally associated with the piezoelectric element itself in addition to what amounts to a second electrode, the additional recitation of an electrically conductive coating material. This is essentially what is taught and shown in Bullock upon a careful consideration of his teachings. As

indicated earlier in this opinion, Bullock himself clearly alludes to if not strongly suggests that it was known in the art to utilize electrodes on both sides of the piezoelectric bars 2 one of which comprises essentially the claimed electrode element itself. The additional claimed conductive coating would comprise in Bullock either the additional use of the conductive material within the epoxy used to bond the bars 2 to the metal substrate bar 3 as taught at column 2, lines 54-59 or the alternative use of the wire screen mesh shown in Figure 4 which is in turn shown in Figure 3 and discussed at the top of column 3 as the most desirable approach to follow in constructing Bullock's device. In the latter case, the epoxy itself need not be made conductive since the effect of ensuring the conductivity between the electrodes of the bars 2 has been assured by the use of the wire screen 13. Figure 3 shows that the conductor 12 is in effect connected to the edge of the wire mesh 13 also shown by its numerical identifier 13 in Figure 4. Bullock's teaching of the use of the wire mesh 13 in Figures 3 and 4 also meets the feature of the mesh grid in dependent claim 7. Because the wire mesh 13 is shown to in part comprise a plurality of mutually parallel strips, the feature recited in dependent claim 8 is also met by Bullock.

We therefore do not agree with appellants' assertions in the brief that the prior art relied upon by the examiner does not show both an inner electrode of a piezoelectret element and the additional use of an electrical conductive coating between this electrode and the substrate material.

The use of this additionally claimed electrically conductive coating is said by appellants to provide a solution to a known problem in the art. This is reflective of the statement made at page 1 of the specification, lines 16-20 as well as the discussion in the paragraph bridging pages 4 and 5 of the specification as filed. Upon a careful consideration of Bullock's teachings as we just outlined, it is apparent that even though Bullock does not intend to solve the particular problem outlined by appellants to use the electrically conductive coating to ensure that the electric transducer remains functional even when the inner electrode may be damaged due to material fatigue, Bullock essentially teaches the dual electrode layers anyway, thus inherently achieving the disclosed but unclaimed feature.

To the extent appellants argue that the purposes of the references relied upon by the examiner are different from the appellants' disclosed purpose, this is not pertinent to the issue and is essentially irrelevant if the prior art teachings would have led the artisan to construct an arrangement having the



claimed structural features. In re Heck, 699 F.2d 1331, 216 USPQ 1038 (Fed. Cir. 1983) and In re Kronig, 539 F.2d 1300, 190 USPQ 425 (CCPA 1976). In re Heck also indicates that the use of patents as references is not limited to what the patentees described as their own invention. The law of obviousness does not require that references be combined for reasons contemplated by an inventor, but only looks to whether the motivation or suggestion to combine references is provided by prior art taken as a whole. In re Beattie, 974 F.2d 1309, 24 USPQ2d 1040 (Fed. Cir. 1992). In an obviousness determination, the prior art need not suggest solving the same problem set forth by appellant(s). In re Dillon, 919 F.2d 688, 692-93, 16 USPQ2d 1897, 1901 (Fed. Cir. 1990) (en banc) (overruling in part In re Wright, 848 F.3d 1216, 1220, 6 USPQ2d 1959, 1962 (Fed. Cir. 1988)), cert. denied, 500 U.S. 904 (1991).

As noted earlier, the combined teachings and suggestions of Bullock and Stein do not indicate to us the obviousness of the features recited in dependent claims 16 and 17 as argued by appellants in the brief. The subject matter set forth in dependent claim 16 is reflective of the arrangement shown in disclosed Figure 4. There is no teaching or suggestion in either reference relied upon which would have indicated to the artisan the desirability of the claimed feature set forth in claim 16 of

a substrate overlapping both the conductive coating and the inner electrode at the edges thereof. In a corresponding manner as to claim 17, the feature of both the conductive coating and the inner electrode having exposed portions is not taught or suggested among both references in addition to the lack of any teaching in either reference of utilizing an insulating lacquer to cover these exposed regions. The examiner's reasoning in the answer also has not addressed the features of these two dependent claims.

In view of the foregoing, the examiner's decision rejecting claims 1-19 under 35 U.S.C. § 103 is sustained except for dependent claims 16 and 17. As such, we therefore sustain the rejection of claims 1-15, 18 and 19. Therefore, the decision of the examiner is affirmed-in-part.

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No time period for taking any subsequent action in  
connection with this appeal may be extended under 37 CFR  
1.136(a).

AFFIRMED-IN-PART

James D. Thomas	)	
Administrative Patent Judge	)	
	)	
	)	
Anita Pellman Gross	)	BOARD OF PATENT
Administrative Patent Judge	)	APPEALS AND
	)	INTERFERENCES
	)	
Stuart S. Levy	)	
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